

Abstract

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The genus *Geissospermum* growing in South America is important for phytochemistry because it contains indole alkaloids. This southamerican tree is in traditional treatment used for therapy of different diseases such as cognitive disorders, malaria or therapy of cancer. This plant was chosen for next investigation because of screening study that has shown very interesting activity against cholinesterases (IC_{50} AChE = $10.51 \pm 3.03 \mu\text{g/ml}$ a IC_{50} BuChE = $0.39 \pm 0.057 \mu\text{g/ml}$).

The aim of this study was to get summary extract from the stem bark, its processing, isolation of at least one pure alkaloid and definition of its structure. Thanks to chromatographic methods the alkaloid extract was separated into 16 fractions, which were processed afterwards. The isolation of alkaloids was from the fraction GV-8, which was separated by flash chromatography and following purification of isolated alkaloids by thin layer chromatography. The only pure alkaloid was isolated from this fraction (vellosimine), in which was tested the inhibition activity against human recombinant acetylcholinesterase and butyrylcholinesterase and inhibition activity against GSK-3 β . In comparison with standart vellosimine shown interesting inhibition against BuChE and GSK-3 β (IC_{50} BuChE = $11.79 \pm 0.74 \mu\text{M}$ a IC_{50} GSK-3 β = $7.18 \pm 1.12 \mu\text{M}$).

In the theoretical part I deal with known biological activities discovered in the past in different alkaloids isolated from *G. vellosii*. In some diseases there is known even alkaloid responsible for carrying of the effect, in some it is not specified yet. Effectiveness of the extract from *G. vellosii* was proved in treatment of malaria (geissolosimine), ovarian, colorectal (flavopereirine), prostatic (flavopereirine) and pancreatic cancer, benign prostate hyperplasia (flavopereirine), Alzheimer disease (geissospermine) and pain treatment (12-metoxy-1-methyl-aspidospermidine). Vellosimine has no proved biological activity yet.

Key words: *Geissospermum vellosii*, Apocynaceae, malaria, cancer, Alzheimer disease, benign prostate hyperplasia, vellosimine, geissolosimine, flavopereirine, geissospermine.